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| **Patterns Galore**  \*Lesson is adapted from activities in *ThinkMath!,* Harcourt School Publishers, 2008. |
| **Mathematics, Grade 2** |
| **Materials:**   * Linking cubes and a variety of manipulatives such as pattern blocks, buttons, color tiles, etc. * Large and small paper clips |
| **TEKS/SEs:**   * 2.5A – find patterns in numbers such as in a 100s chart * 2.6C – identify, describe, and extend repeating and additive patterns to make predictions and solve problems   **Objective 6 TEKS/SEs (Underlying Processes and Mathematical Tools):**   * 2.12A – identify the mathematics in everyday situations * 2.12B – solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness * 2.12D – use tools such as real objects, manipulatives, and technology to solve problems * 2.13A – explain and record observations using objects, words, pictures, numbers, and technology * 2.13B – relate informal language to mathematical language and symbols * 2.14 – use logical reasoning; justify thinking using objects, words, pictures, numbers, and technology |
| **Lesson objective(s):**   * + Students will :     - Create, describe, and extend growing and repeating patterns     - Explore patterns in different modalities |
| **Differentiation strategies to meet diverse learner needs:**   * Problem- solving, inquiry-approach * Hands-on exploration * Collaboration and discussion |
| **ENGAGEMENT:**   * C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngGive each group large and small paper clips, and allow them to play around with the clips for a few minutes. Then demonstrate how to create the following **repeating pattern** with the large and small paper clips. * C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngAsk students to describe the pattern. Have them identify where the pattern first starts to repeat. Have them identify the part that repeats. Then have several volunteers extend the pattern by adding one clip to the end of the line. C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].png |
| **EXPLORATION**  **Part 1**:   * C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].png*C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].pngC:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].png*Repeat the Engagement with a **growing, or additive, pattern** such as:   *C:\Documents and Settings\118bonnellj\Local Settings\Temporary Internet Files\Content.IE5\ZNZ5I5NR\MCj04347760000[1].png*   * Ask students to make as many different patterns as they can with the large and small paper clips. Encourage them to use creativity in their patterns using position, size, and color if possible. Encourage them to make both repeating and growing patterns. Help them to avoid making patterns that are too complicated. * The patterns may use only large clips, small clips, or both sizes. If colored paper clips or clips of different materials are available you might include those as well. * In order to compare and contrast different patterns, encourage them to record each pattern by drawing or tracing the clips on separate paper.   **Part 2**:   * Have groups switch papers and ask students to continue their peer’s pattern.   + *How do you know that you continued the pattern correctly?*   + *Does the pattern* ***repeat*** *or does it* ***grow*** *(or do both)?*   + *Where does the pattern start to repeat?*   + *If it grows, by how much is it growing each time? (How much are you adding each time?)* |
| **EXPLANATION**   * Students will explain their thinking and justify their solutions in groups and in whole-class discussion, as well as with drawings, diagrams, and oral explanations. |
| **ELABORATION**   * Build trains of linking cubes to show an example of a pattern and a non-pattern. Build the trains gradually and have children predict the next block. * In the train with the pattern, they will easily predict the next color. In the other train, they will not be able to predict the next color * Demonstrate both repeating and growing patterns and have students describe the patterns. * Have partners create their own patterns in any medium. Have available cubes, pattern blocks, color tiles, and buttons. They may also create patterns with sounds or movements. * Invite children to take turns sharing their patterns at their tables and explain how they know theirs is indeed a pattern. Encourage students to record by drawing pictures. * Select some children to share their pattern, one at a time, with the class, and ask other class members not from that table to extend their pattern. |
| **EVALUATION**   * Observe students as they create patterns:   + *Do students make consistent patterns or are there inconsistencies in their work?*   + *Do the patterns grow?*   + *Can students tell by how much the pattern grows each time? (How much more do you add each time?)*   + *Do the patterns repeat?*   + *Can students identify the part that repeats?*   + *Can students explain the pattern so that another person could recreate it?*   + *Are the patterns complex or simple?* |